Unit 4

Implementation of Animal Breeding Services in Dairy Animals

Introduction

In this unit we will learn about selection of animals for breeding, various breeding methods and artificial insemination. Students will also learn the methods of detection of oestrus and the best time for artificial insemination. Reproductive health is vital for animal productivity. Therefore, basic aspects of reproductive health and diseases affecting the same have also been discussed in this unit.

Session 1: Selection of Animals

Selection of good animals for milk production is very important for starting a dairy farm. The selection of dairy animals can be done in the following ways—

(i) based on available farm records

(ii) based on body conformation of animals

In the absence of authentic records it is very difficult to ascertain the actual production potential of an animal. The following points need to be considered while selecting the best animals for milk production.

Selection of animals for milk production

(i) Parity: Ideally, farmers select animals in their first or second parity. If selected in the first or second parity, a cow will have milk for 4–5 lactations after purchase. Generally, maximum milk yield is obtained in the third to fifth lactation in cattle.

Parity is defined as the number of times a female has had an offspring. If a cow has calved twice, then the parity will be two.

(ii) Age of the animal: Ideally, cows of 3–4 years of age are selected for purchase. At this stage, the animal should be in its first or second parity. If the heifers are purchased at the time of puberty, it should be ensured that they have attained two-third of their adult body weight.

(iii) Body conformation: Animals that are healthy and have a shining coat should be selected by the farmers. While selecting dairy cows, it should be kept in mind that the animal is not carrying too much fat on its body. The selected animals should conform to its ideal breed characteristics.

(iv) Head: Efforts should be made to select the animals with sufficiently broad jaws, which help in chewing and rumination. The muzzle of the cow should always be moist, which indicates good health. Eyes should be shining.

(v) Neck: The animal should have a long and slender neck. There should not be too much fat on it.

(vi) Thorax: The thorax of the animal should be of a large capacity. A large thorax region provides more space for vital organs like the heart and lungs, which are essential for respiration and blood circulation. In dairy cows, three ribs of the animal should be visible from the outside. This indicates lack of excessive fat (Fig. 4.1).

Fig. 4.1: Thorax is the middle part of the body between the neck and the abdomen. The three ribs are also visible.

(vii) Back: The cow's back should be straight. The abdomen should be capacious (Fig. 4.2). The base of the tail should be slightly raised.

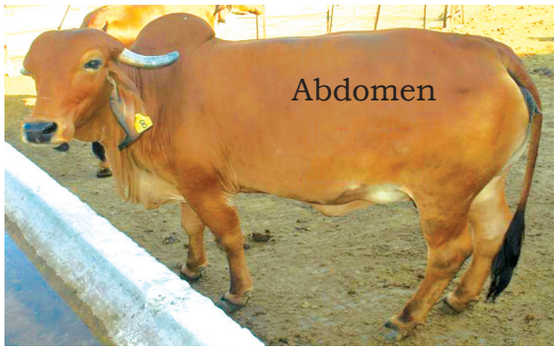


Fig. 4.2: Photograph showing abdomen of the cow

(viii) Legs: The forelegs should be straight. There should be sufficient space between the two forelegs and two hind legs. Sufficient space between the two hind legs allows for proper development of the udder. The hooves of the animal should be flat and broad so that the animal is able to stand properly on its legs. Dark black hooves are ideal as they are comparatively harder than the light coloured ones.

(ix) Udder: The udder of the dairy cattle should be large and capacious. It should be tightly attached to the abdomen. All the teats of the udder should be symmetrical and of equal size. The consistency of the udder should be soft. The skin of the udder should also be soft and pliable. The udder should appear shrunken after complete milking.

(x) Rear part: The examination of the rear part of the animal should be done from behind. The two pin bones should be distinctly visible. The rear part of the animal should preferably look angular.

(xi) Other points to be considered: Pregnancy status of the animal should be enquired while purchasing it. If the cow is not pregnant, the date of last calving should be enquired. The milk yield of the animal should be ascertained by milking at least three successive times. While milking, the following points should be considered:

(a) ease of milking,
(b) health and disease condition of the udder,
(c) blockage of teats and
(d) whether the cow is adjusted to a particular milker.

These points should be considered while selecting animals for purchase. A thorough knowledge of breed characteristics and body configuration of the animals is essential for their selection. If required, the help of a veterinarian should be taken for this purpose.

Practical Exercise

1. Visit a dairy farm. Examine and recommend animals for selection of purchase.
2. Interact with dairy farmers for desirable traits that they would look for in the animals to be purchased.

Check Your Progress

A. Multiple Choice Questions

1. Maximum milk yield is obtained in animals during their _____.
   (a) first lactation (b) fifth lactation
   (c) third lactation (d) seventh lactation
2. The muzzle of a healthy animal should be _____.
   (a) dry (b) moist
   (c) dull coloured (d) None of the above
3. The skin of the udder of ideal animals should be _____ after complete milking.
   (a) shrunken (b) tense
   (c) distended (d) None of the above
4. The eyes of a healthy animal should be _____.
   (a) dry (b) swollen
   (c) bulged (d) shining
5. The animals should be selected for purchase on the basis of _____.
   (a) body conformation (b) farm records
   (c) both (a) and (b) (d) None of the above

B. Fill in the Blanks

1. Ideally, animals in their _____ parity should be selected.
2. Good heifers should have attained _____ of their adult body weight at puberty.
3. In dairy cows _____ ribs should be visible, which indicates lack of excessive fat.
4. Cows should have _____ coloured hooves.

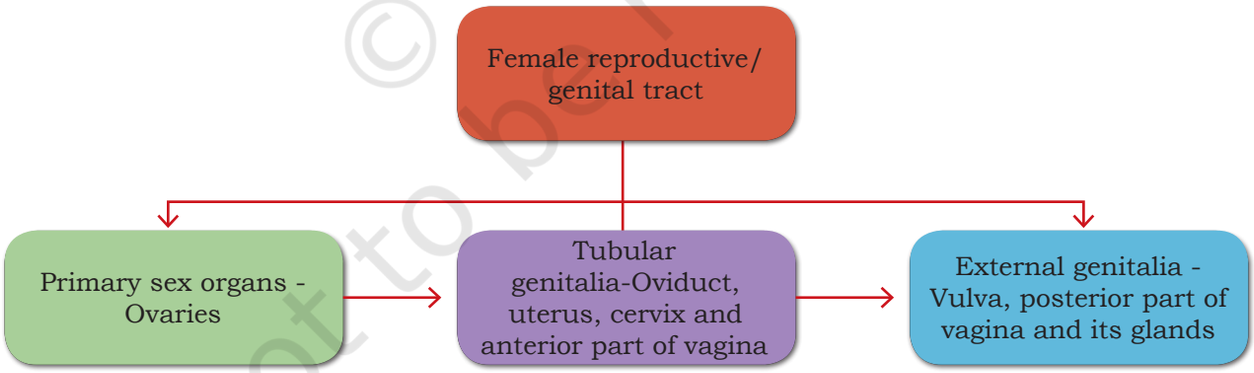
5. On examination from the rear, the points of _____ bone should be distinct in dairy animals.

C. Mark True or False

1. An ideal dairy animal should have abundant fat on the neck and other body parts.
2. The parity of animal should not be considered while selecting dairy animals.
3. There should be minimum space between the two forelegs in dairy animals.
4. Ideally, the abdomen and thorax region of the dairy animals should be capacious.
5. Dark coloured hooves in dairy cows are more hard and firm as compared to light coloured hooves.

Session 2: Basic Reproductive Anatomy

The objective of this session is to understand the dairy animals' physiology and reproductive anatomy system. This knowledge is a requirement for good dairy management, because all products from dairy farms such as calves, heifers and milk depend on the reproductive efficiency of the dairy animals. Maximum reproductive efficiency is a precondition for economical milk production.



The Reproductive Anatomy of Cattle and Buffalo

The animal health workers should be well-versed with the anatomy and physiology of female reproductive

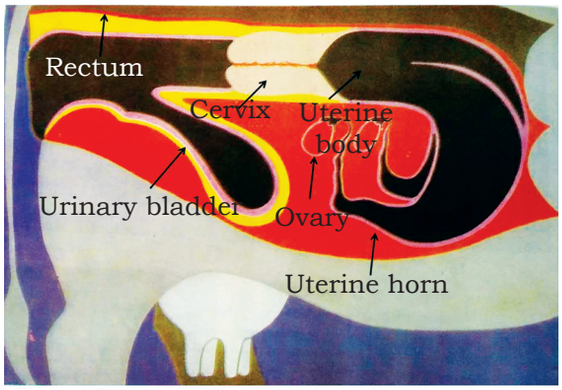


Fig. 4.3: A sketch of the female reproductive tract in cattle

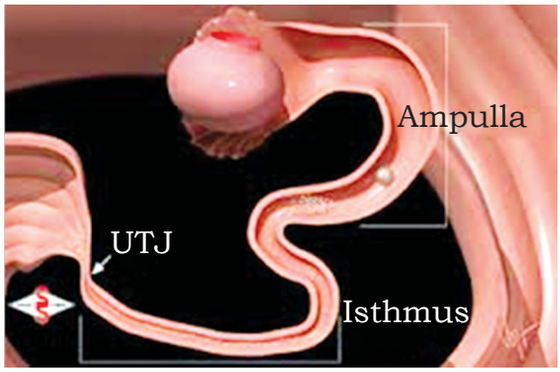


Fig. 4.4: The ovary with oviduct and its attachment with uterus at utero-tubal junction

organs. The reproductive tract of farm animals can be discussed under the following heads (Fig. 4.3).

Primary sex organs (ovaries)

Ovaries are the primary sex organs in a female. They are paired organs and contain follicles, produce ova and secrete hormones like estrogen, progesterone, etc. The ovum is fertilised by spermatozoa forming embryo, which subsequently develops into an offspring.

Tubular Genitalia

Oviduct/Fallopian tube consists of three parts namely, infundibulum (funnel shaped), ampulla and isthmus (Fig. 4.4). The oviduct performs the unique function of simultaneously conveying eggs and spermatozoa in opposite directions. The junction of ampulla and isthmus of the oviduct also acts as a site of fertilisation in farm animals.

Uterus

It is a hollow muscular organ consisting of body and two horns (Fig. 4.5). The uterus can enlarge and extend

Fig. 4.5: The uterus of a cow

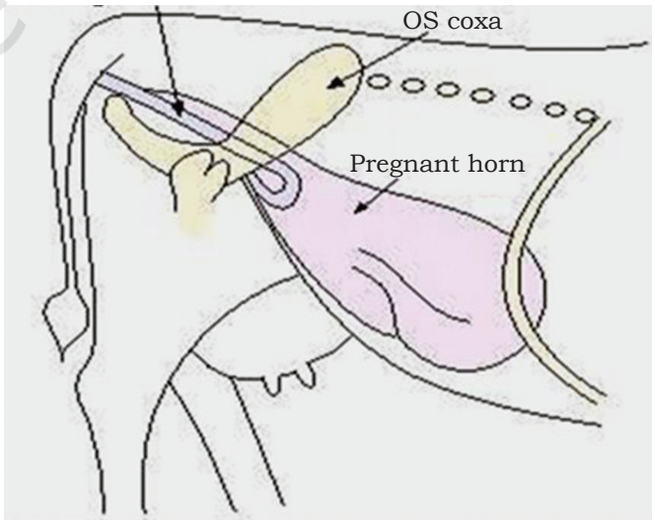


Fig. 4.6: A sketch showing the comparative growth of a uterus in non-pregnant and pregnant animals

itself to accommodate the foetus during pregnancy and again reduce following parturition to its original size and form (Fig. 4.6).

Cervix

It is a cylindrical part of the female reproductive tract (Fig. 4.7 and 4.8). The cervix performs the following functions.

(i) Acts as a barrier to prevent the entry of infection in uterus.

(ii) Acts as a reservoir for sperms.

(iii) Forms a pregnancy seal by secreting thick mucus during pregnancy i.e., 'cervical plug'.

(vi) Is responsible for expulsion of foetus during parturition.

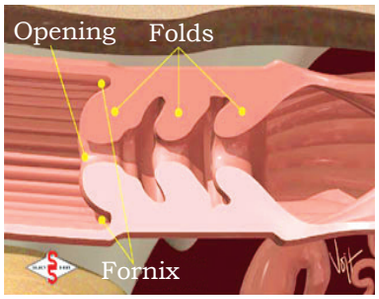


Fig. 4.7: Diagram showing cervical folds


Fig. 4.8: Photograph showing external os of cervix marked with a green straw

Vagina

It is a hollow tubular structure. It is the organ of copulation in female animals.

External genitalia

Vulva is the external part of the female genital tract. It has closed vulvar lips. The vulva lies just below the anus. When the vulvar lips are separated, a round rudimentary structure, known as clitoris lies on the floor. Clitoris is homologous to the penis in male animals. The vulva of a cow has tuft of hair on its lower aspect (Fig. 4.9 and 4.10).

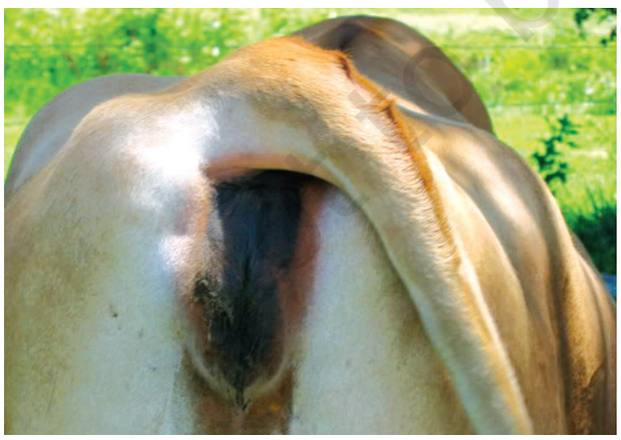


Fig. 4.9: Tufts of hair on the vulva of cow


Fig. 4.10: Tufts of hair absent on buffalo's vulva

Practical Exercise

1. Identify different parts of the female reproductive system.

Check Your Progress

A. Multiple Choice Questions

1. A pair of primary sex organs in a female is called
   (a) testis (b) ovaries
   (c) seminal vesicles (d) penis
2. The site of production of ova is
   (a) vulva (b) vagina
   (c) ovaries (d) uterus
3. Which of the following is a barrier to prevent the entry of infection in uterus?
   (a) cervix (b) ovary
   (c) vagina (d) none
4. Pregnancy occurs in the
   (a) vulva (b) vagina
   (c) ovary (d) uterus
5. The site of fertilisation in cattle is called the
   (a) uterus (b) ovary
   (c) infundibulum (d) ampullary-isthamus junction

B. Fill in the Blanks

1. The primary sex organs in cattle are _____.
2. The external part of a female genital tract is _____.
3. The uterus of a cow has a body and _____ uterine horns.
4. _____ is the organ of copulation in female animals.
5. The structure responsible for secretion of hormone estrogen is _____.

C. Mark True or False

1. The vulva is a part of the tubular genitalia of the female genital tract.
2. Infundibulum is a part of the cervix.
3. Oviduct is also known as the organ of copulation in female animals.
4. The cervix acts as a sperm reservoir.
5. The clitoris is a structure homologus to a male penis.

Session 3: Basic Physiology of Reproduction

Reproduction is the process of producing an offspring. The process consists of expression of oestrus in females, mating of male and female, pregnancy, and giving birth to young ones. It is regulated in an orderly manner by chemical messengers called hormones. Hormones are produced in one part of the body (glands) and transported to other parts (target organs) to influence their functions. The main hormones affecting reproduction in animals are gonadotropin releasing hormone (GnRH), follicle stimulating hormone (FSH), luteinising hormone (LH), estrogen, progesterone, oxytocin, and prolactin.

Oestrus and Oestrus Cycle

A female dairy animal is in oestrus when she allows mounting by the male. The chain of events that starts at one oestrus and ends at the next is termed as oestrous cycle. The oestrus cycle consists of four phases as shown in Fig. 4.11.

It must be borne in mind that the oestrus cycle is like a relay race where the second phase does not begin until the first phase of the cycle has ended. These four phases of oestrus cycle can be broadly grouped into the following types on the basis of a predominant structure present on the ovary.

(a) Follicular phase

(b) Luteal phase

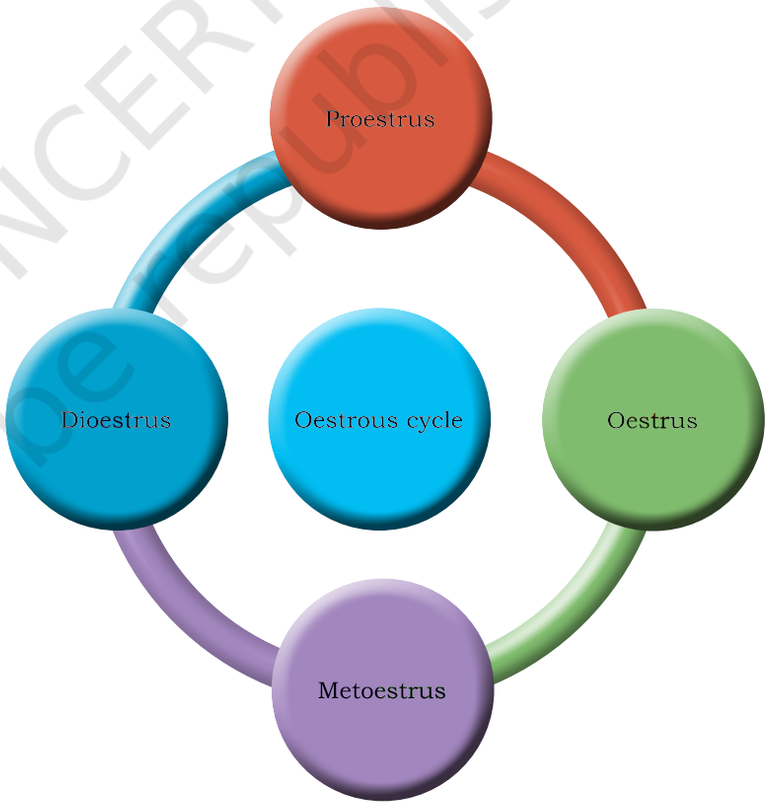


Fig. 4.11: Phases of oestrous cycle

Follicular Phase of oestrus cycle consists of proestrus and oestrus. A prominent follicle is present on the ovary during this stage.

Proestrus is also known as the preparatory stage or 'building-up phase' of the oestrus cycle. This phase lasts for 3 to 4 days.

Oestrus is the period of sexual receptivity in animals. This is also called 'heat' in common terms. The female animal shows marked sexual desire during this stage. The estrogen level is high during this stage, which is responsible for visually observable signs. Vaginal mucus membrane becomes pink, transparent and mucus discharge is secreted, which usually breaks at the hock joint. The average duration of standing heat is 18 to 24 hours. An oestrus cow stands to allow the male to mount her during the oestrus phase.

Luteal Phase of oestrus cycle consists of metoestrus and dioestrus. It is characterised by the presence of corpus luteum.

Metoestrus is a stage during which the visually observable signs of oestrus disappear. This stage follows oestrus and lasts for 3–4 days. In cattle and buffaloes ovulation occurs approximately 8–10 hours after the end of oestrus, during metoestrus.

Dioestrus is the longest phase of the oestrous cycle. It lasts from day 5 to day 17 of the oestrus cycle. A functional corpus luteum is present during this stage and secretes progesterone.

Practical Exercise

1. Visit a dairy farm and observe animals in different stages of the oestrous cycle.

Check Your Progress

A. Multiple Choice Questions

1. Follicular phase includes _____
   (a) oestrus (b) proestrus
   (c) both a and b (d) metoestrus
2. The shortest phase of the oestrus cycle is _____
   (a) oestrus (b) proestrus
   (c) dioestrus (d) metoestrus
3. The average duration of the oestrus cycle in a cow is
   (a) 5 days (b) 10 days
   (c) 16 days (d) 21 days

4. _____ is the resting phase of the oestrus cycle.

(a) Oestrus (b) Proestrus
(c) Dioestrus (d) Metoestrus

5. _____ is the preparatory phase of the oestrous cycle.

(a) Oestrus (b) Proestrus
(c) Dioestrus (d) Metoestrus

B. Fill in the Blanks

1. _____ is the period of sexual receptivity.
2. _____ hours is the duration of standing heat.
3. _____ is the longest phase of the oestrus cycle.
4. _____ is present on the ovary during the luteal phase of the oestrus cycle and secretes progesterone.
5. The colour of the vaginal mucous membrane during the oestrus is _____.

C. Mark True or False

1. The site of fertilisation in cattle is cervix.
2. Corpus luteum is present on the ovary during the follicular phase.
3. Ovulation in cattle occurs during metoestrus phase of the oestrus cycle.
4. Sexual desire is manifested by the female in the oestrus phase.

Session 4: Basic Animal Breeding

Animal breeding methods have been broadly classified into inbreeding and outbreeding (Fig. 4.12).

Inbreeding

Inbreeding is mating of more closely related animals. It is mating of related animals within the past four to six generations.

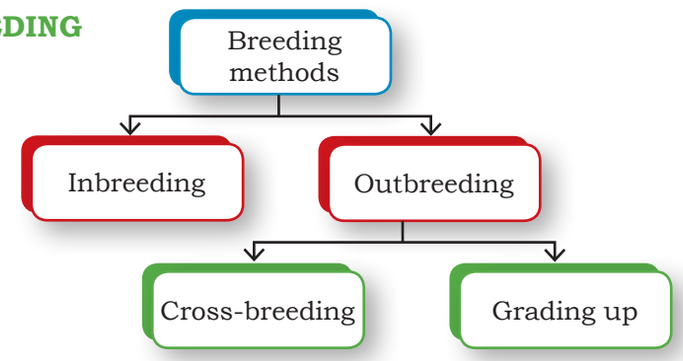


Fig. 4.12: Animal breeding methods

Outbreeding

Outbreeding means breeding of unrelated animals. Outbreeding is classified into the following types.

Cross-breeding: In this system animals of different breeds are mated. For example, Karan Fries cattle have been produced by crossing *Holstein Friesian* (North American) and *Tharparkar* (Indian) (Fig. 4.13). Cross-bred animals show higher growth and vigour as compared to their parents. They usually produce more milk.

Fig. 4.13: Picture of Karan Fries (cross-bred cattle)

Grading up: This is the method of breeding male animals of a particular breed to non-descript females. The offspring, thus produced, is again mated to the male of the same breed as its father. Grading up is used to produce pure-bred animals from non-descript animals after the seventh or eighth generation.

Practical Exercise

1. Visit any livestock farm and enquire about different types of breeding practices.
2. Talk to the animal workers and get acquainted about different types of cross-bred and pure-bred animals in the farm.

Check Your Progress

A. Multiple Choice Questions

1. The phenomenon when two different breeds are mated resulting in progeny with increased vigour is known as

   (a) line breeding. (b) cross-breeding.
   (c) rotational breeding. (d) grading up.

2. Breeding of sires of a particular breed with non-descript females is known as

   (a) back crossing. (b) cross-breeding.
   (c) criss-crossing. (d) grading up.

3. Karan Fries is an example of a cross between

   (a) Brown Swiss x Jersey.
   (b) Holstein Friesian x Sahiwal.
   (c) Holstein Friesian x Tharparkar.
   (d) None of the above.

4. In grading up, which animal belongs to a non-descript breed?

   (a) Female (b) Male
   (c) Both (a) and (b) (d) None of the above

5. Which of the following breeding methods is useful for evolving a pure-breed from non-descript cattle?

   (a) Inbreeding (b) Outcrossing
   (c) Cross-breeding (d) Grading up

B. Fill in the Blanks

1. Breeding among unrelated animals is known as _____.
2. Breeding among closely related animals is known as _____.
3. _____ results in the production of pure-bred animals after the seventh or eighth generation.
4. _____ is the system in which two different breeds are mated.
5. Grading up is a type of _____.

C. Mark True or False

1. Cross-breeding is the mating of closely related animals.
2. Cross-breeding is used to increase vigour and production of offspring.
3. Inbreeding is the mating of unrelated animals.
4. In grading up, a non-descript male is mated to a pure-bred female.
5. Grading up is used to evolve pure-bred animals from the non-descript population.

NOTES

Session 5: Techniques of Oestrus Detection

An efficient system enables early detection of animals in oestrus. The animals can be bred on time if oestrus detection is proper.

Methods of Oestrus Detection

Oestrus is the only visually observed phase of the oestrus cycle. Fig. 4.14 represents the methods of oestrus detection.

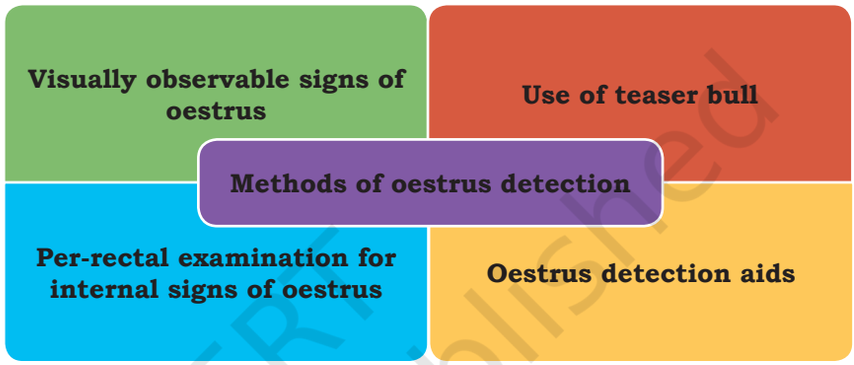


Fig. 4.14: Different methods of oestrus detection

Fig. 4.15: Cow standing still to be mounted

Visually observable signs

The visually observable signs of oestrus can be classified as primary and secondary.

Primary sign of oestrus is when the cow is standing still to be mounted by other cows or bull (Fig. 4.15). This is the most definite sign of oestrus.

Secondary sign of oestrus may not indicate a definite oestrus. The secondary

signs of oestrus are listed in Fig. 4.16 and shown in Figs, 4.17 and 4.18.

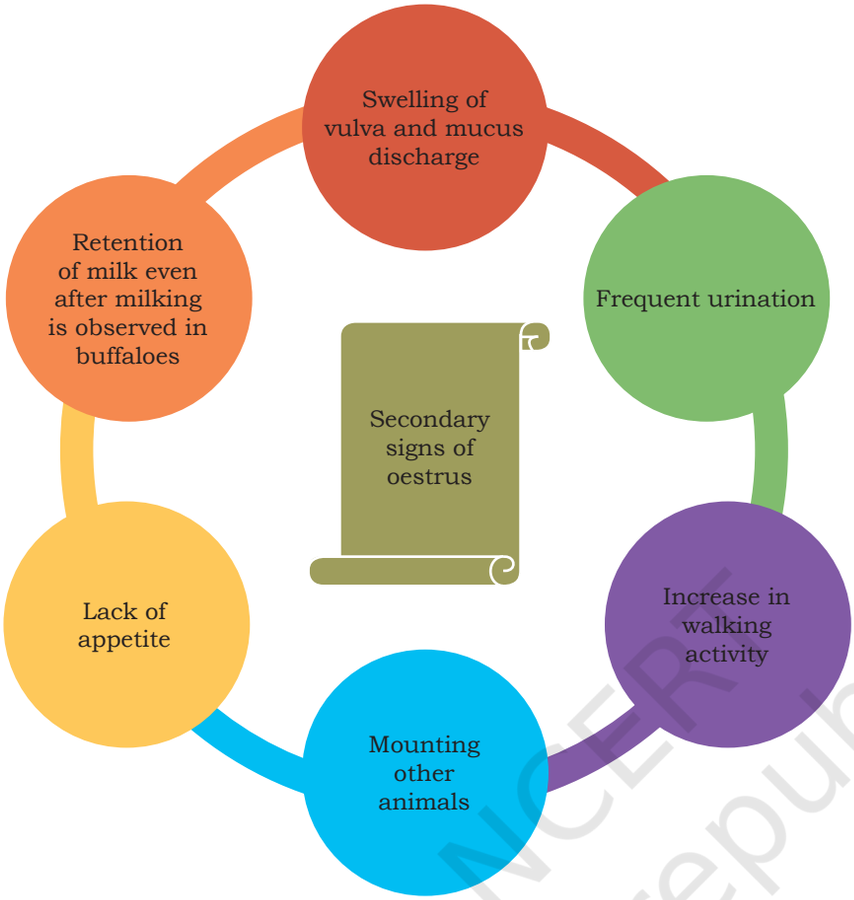


Fig. 4.16: Secondary signs of oestrus

Fig. 4.17: Secondary sign of oestrus (mucus discharge)

Fig. 4.18: Redness of vulvar mucous membrane during oestrus

Use of teaser bull

This is a useful method of oestrus detection in which a teaser bull (an infertile bull, which retains

Fig. 4.19: Teaser buffalo bull used in heat detection

Fig. 4.20: Tail chalk for oestrus detection

sexual desire or mounting activity) is paraded in the herd twice or thrice daily. The oestrus cows will stand to be mounted by the teaser bull (Fig. 4.19). Oestrus detection using a teaser bull is carried out in the early morning or late evening.

Using oestrus detection aids

The use of heat detection aids improves efficiency of oestrus detection. The following oestrus detection aids are commonly used.

Tail chalk or paint: Chalk or paint is rubbed on the rump and tail heads of the cattle every day (Fig. 4.20). Spreading or disappearance of chalk or paint indicates that the cow has been mounted by her herd mates.

Heat mounting detectors: Such types of detectors are glued to hair on the midline just in front of the base of the tail of the female animal. Mounting by other animals squeezes the dye from the reservoir of the detector, which induces a colour change in the dye. This colour change can be easily observed to detect heat in the animal.

Fig. 4.21: Chin ball device and how it is fixed on cattle

Chin ball device: Teaser bulls are used as 'marker animals' and are fitted with chin ball marking devices. When a marker animal presses down with its chin on the back or rump of a cow in oestrus, the valve fitted in the device opens and marker fluid is released (Fig. 4.21).

Pedometer: This is a digital device for calculating the distance covered by the female animal. Females in heat walk twice as much compared to the animal not in heat. Thus, pedometers help in identifying animals in heat (Fig. 4.22).

CCTV Camera: It involves surveillance and recording of animal behaviour in a confined area. It requires evaluation of an entire day's recording.

Electrical conductivity of oestral mucus: Measurement of electrical conductivity of genital secretions with the help of a conductivity meter often detects the animal in true oestrus. It also tells the exact time of insemination.

Fig. 4.22: Pedometer for oestrus detection

Per-rectal examination for confirmation of oestrus

After reaching the preliminary conclusion that the animals are in heat, per-rectal examination of the animal is carried out to confirm the heat status (Fig. 4.23). It is a type of confirmatory diagnosis. Per-rectal examination is performed by restraining the animal in the trevis (an enclosure to restrain the animal for such examination). Per-rectal examination during heat period will reveal open external os cervix. 'Os cervix' is a part of the reproductive tract in a cow or buffalo located in the pelvis. It is the opening in the lower part of the cervix between the uterus and vagina. The cervix is relaxed and soft during oestrus. The uterine horns will be in tone, i.e., they will be tightly curled.

Fig. 4.23: Per-rectal examination of a buffalo for detection of heat

Practical Exercise

1. Visit a livestock farm. Record visually observable signs of oestrus.
2. Talk to the animal workers about day-to-day practices in detection of oestrus.

Check Your Progress

A. Multiple Choice Questions

1. Inaccurate and faulty heat detection leads to
   (a) extended calving intervals.
   (b) delayed insemination.
   (c) reduced conception rates.
   (d) All of the above.
2. Which of the following is a method of heat detection?
   (a) Visually observable signs
   (b) Per-rectal examination
   (c) Use of teaser bull
   (d) All of the above
3. Secondary signs of oestrus include
   (a) frequent urination.
   (b) swelling of the vulva and clear and stringy mucus discharge.
   (c) bellowing.
   (d) All of the above.
4. Common errors in heat detection are
   (a) inadequate time for observation.
   (b) ignoring the heat signs.
   (c) negligence towards heat signs.
   (d) All of the above.
5. Heat observations can be facilitated by
   (a) heat mounting detectors.
   (b) pedometers.
   (c) CCTV camera.
   (d) All of the above.

B. Fill in the Blanks

1. _____ is the only observed phase of the entire oestrus cycle.
2. Primary sign of oestrus is that the cow remains standing _____.
3. Bulls that are infertile but retain sex drive and used for detection of heat are called _____.
4. At the time of oestrus the distance covered by the cow is _____times as compared to a normal cow.
5. External os cervix is _____ during oestrus phase of oestrous cycle.

C. Mark True or False

1. Clear and stringy mucus discharge from vulva is a primary sign of oestrus.
2. Pedometer is an oestrus detection aid.
3. An effective heat detection technique should provide continuous monitoring of a cow.
4. Inseminating a cow on the basis of oestrus signs will result in excellent conception rates.
5. Standing to be mounted is a secondary sign of oestrus.

SESSION 6: ARTIFICIAL INSEMINATION

Artificial Insemination (AI) is a technique of depositing semen into the female uterus or cervix artificially, with the use of instruments.

The union of sperm with ovum is essential for conception. Ovum is released from the ovary 8–12 hours after the end of oestrus. Ovum travels through the fallopian tube and remains viable up to 12–24 hours after release from the ovary. The lifespan of a sperm in the female genital tract is 12–24 hours. If artificial insemination is done after 12 hours of onset of oestrus, there are maximum chances of conception.

ADVANTAGES OF AI

(i) Normally one bull can serve 25 cows by natural service. A single ejaculation of semen, after processing of the same can be used for approximately 500 artificial inseminations.

(ii) The expenditure in rearing the breeding bull by the farmer can also be avoided.

(iii) AI reduces the chances of spreading sexually transmitted diseases like vibriosis, trichomoniasis, etc., in the animals.

(iv) AI reduces the risk of inbreeding if proper records are maintained.

(v) Superior quality germplasm can be transported to different places economically.

(vi) Good quality bulls, which are unable to serve naturally due to injury or certain disease, can be used for semen collection for AI.

REQUIREMENTS OF AI

(i) Proper and accurate heat detection is essential for good results.

(ii) Proper hygiene and sanitation is maintained during the entire process of AI.

(iii) AI requires a skilled technician with proper knowledge of palpation of the female genital tract and handling of semen and liquid nitrogen.

THUMB RULE OF AI

The best time for AI is mid-oestrus which increases the chances of conception. AM-PM is a thumb rule followed for AI in cattle. AM-PM rule means that an animal, which comes in heat in the morning, is inseminated the same evening and an animal which comes in heat in the evening, is inseminated the next morning.

The frozen semen used for AI is stored in a liquid nitrogen container (LN_2 container). The schematic diagram of an LN_2 container is shown in Fig. 4.24.

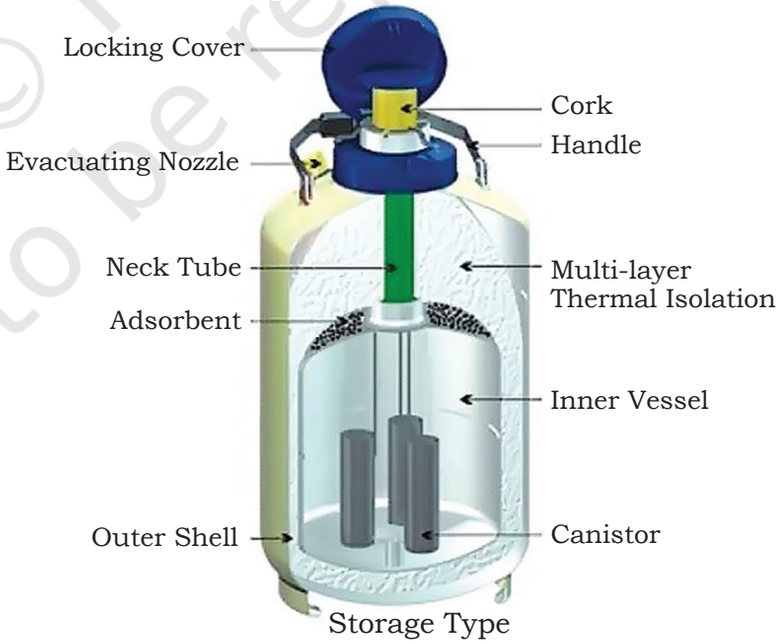


Fig. 4.24: Liquid nitrogen container and its components

RECTOVAGINAL TECHNIQUE OF AI IN CATTLE AND BUFFALO

Out of the many techniques of AI, rectovaginal technique is the most widely used in cattle and buffalo. The important steps of rectovaginal technique of artificial insemination are

(i) thawing of semen

(ii) loading of AI gun

(iii) deposition of semen in female genital tract

Thawing of semen

Before using the frozen semen, it is brought to a liquid state without compromising its quality. This is called thawing. Thawing of frozen semen is done at 37˚C for 30 seconds. The following steps are involved in thawing of frozen semen (Fig. 4.25).

(i) Identifying the canister from which semen straw is to be taken out.

(ii) Removing the lid of the liquid nitrogen (LN_2) container.

(iii) Lifting the canister slightly below the frost line.

(iv) Cooling the tip of the tweezer forceps (used for picking the semen straw) in LN_2 vapour for five seconds.

(v) Grasping the individual straw securely to be removed and lowering the canister back to its actual place.

(vi) If the semen straw is not removed within 10 seconds from the canister, it is again dipped in LN_2 and brought up to the frost line.

(vii) Placing the lid of the container immediately after the removal of straw.

(viii) Shaking the straw in the air to remove LN_2 trapped at factory sealing end of the semen straw.

(ix) Dipping the semen straw in clean warm water (37˚C) for 30 seconds so that the straw is completely submerged in water (the straw is usually placed horizontally in water).

(x) Removing the straw after 30 seconds, wiping it with a paper napkin and noting the details mentioned on the straw such as bull no. and date of filling, name of the semen lab, etc.

Fig. 4.25: Process of thawing of semen in a stepwise manner

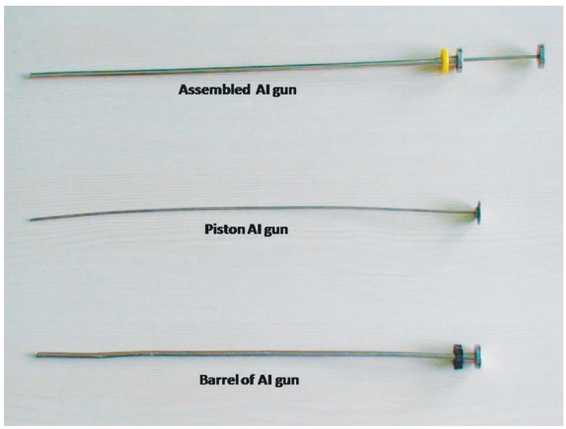


Fig. 4.26: Different parts of an AI gun

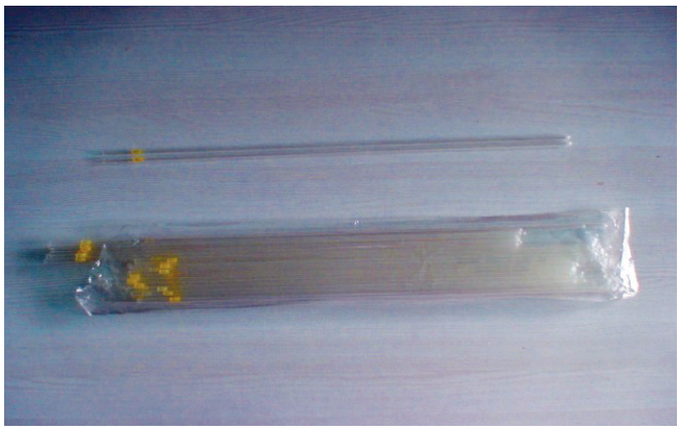


Fig. 4.27: An AI sheath

Fig. 4.28: Material/instruments required for AI

Fig. 4.29: Loading of a straw in an AI gun

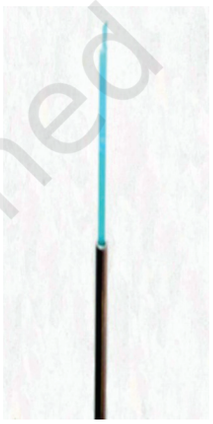


Fig. 4.30: Note the laboratory end on the upper side

Loading of AI gun

The AI gun is loaded in the following manner

(i) The straw is held vertically with the laboratory end on the upper side and shaken in the air to shift the air space to the laboratory end.

(ii) Before loading, the AI gun should be maintained at 37˚C to avoid cold shock to the sperms.

(iii) While loading, the factory sealed end will go inside the AI gun while the laboratory sealed end will be towards the outer end of the gun (Figs. 4.31 and 4.32).

(iv) Cut the straw at a right angle on the laboratory sealed end with a clean scissors (Fig. 4.33).

(v) Fix the AI sheath over the AI gun (Fig. 4.34).

(vi) Lock the sheath with the plastic 'O' lock provided in the AI gun (Fig. 4.35).

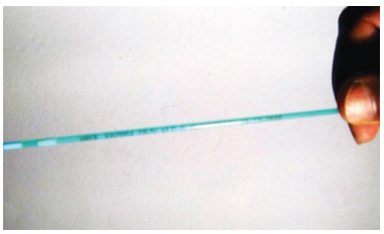


Fig. 4.31: The factory end of a semen straw

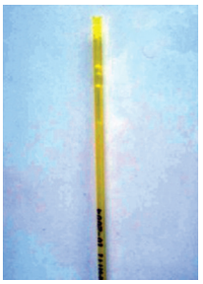


Fig. 4.32: The laboratory end of a semen straw

Fig. 4.33: Cutting of the straw at the laboratory end

(vii) Check if the gun is loaded properly by keeping the gun at eye level and simultaneously moving the piston slowly upwards.

(viii) If the gun is properly loaded then the semen will move slightly upwards.

(ix) If the piston is blocked or it does not move, the gun may be locked.

(x) If movement of meniscus of semen is proper, then cover the AI sheath with a protective sheath.

(xi) Now the AI gun is ready for use (Fig. 4.36).

Fig. 4.36: A loaded AI gun

Fig. 4.34: Placing an AI sheath over the AI gun

Deposition of semen in female genital tract

The steps for the deposition of semen (Fig. 4.37) in the female genital tract are

1. The animal is properly restrained in the trevis.
2. The dung is removed from the rectum.
3. Hold the cervix on the floor of the rectum.
4. Once the cervix is held, the external os is located.
5. Once the animal is confirmed to be in heat, the inseminator should thaw the semen as per standard procedure.
6. The inseminator now holds the AI gun in the right hand, with 2–3 fingers to prevent excessive application of pressure while inseminating.
7. The AI gun is passed horizontally forward along the dorsal side of the vaginal wall to avoid its entry into the urethra. It is pushed upto the external os and guided in to the cervix with fingers and the thumb.
8. Once the tip of the gun is in the uterus, the semen is slowly deposited in the uterus by pushing the piston of the AI gun with the help of the thumb.
9. The AI gun is then slowly and carefully withdrawn from the genitalia.

Fig. 4.35: Locking the AI sheath on the AI gun

1. Hand inserted inside rectum in the shape of a cone

2. Per-rectal examination in process

3. Hanging of stringy cervicovaginal mucus

4. Checking of redness of vulva

5. Passing of AI gun at 45 degree in the vagina

6. Passing gun straight after it strikes the vaginal folds on the roof

7. Pushing the piston with the right hand to deposit semen in the uterus

Fig. 4.37: Images showing the step-by-step process of AI by rectovaginal technique

Practical Exercise

1. Visit an AI centre and interact with the technician about the set-up and instruments used in the technique.
2. Observe the technique of thawing.

Check Your Progress

A. Multiple Choice Questions

1. In rectovaginal technique
   (a) proper checking of the genital organs is possible.
   (b) AI is done in the uterus.
   (c) conception rate is high.
   (d) All of the above
2. Which of the statement is incorrect?
   (a) AM-PM rule is followed for AI.
   (b) Protective clothing and gumboots should be used for AI.
   (c) Canister should be taken out of container for picking straw.
   (d) Animals not showing signs of heat should not be inseminated.
3. Which of the following statement is true?
   (a) Defective or cracked straws should be discarded.
   (b) Breeding history of an animal should be collected before AI.
   (c) External os is open during oestrus.
   (d) All of these
4. Which of the following should be done while handling semen straw during insemination?
   (a) Semen straw should be thawed at 37˚C.
   (b) Straw should be wiped with a tissue paper.
   (c) Straw should be cut at a right angle.
   (d) All of the above
5. Ideally, AI should be done
   (a) 26 hours after onset of oestrus.
   (b) 12 hours after onset of oestrus.
   (c) 26 hours after the end of oestrus.
   (d) 12 hours after the end of oestrus.

B. Fill in the Blanks

1. AI is aimed at maximum utilisation of superior genetics of _____.
2. AI prevents the spread of _____type of diseases.
3. Animal coming in heat in the evening should be

4. Frozen semen is brought back to a liquid state before insemination by a process called_____.
5. _____ is the most reliable technique of AI in cattle.

C. Mark True or False

1. The lid of the liquid nitrogen canister should be placed back immediately after straw removal.
2. The semen straw should be cut at the laboratory end for insemination.
3. The inseminator should not touch the tip of the AI sheath or shaft of the AI gun.
4. The animal should be inseminated after the end of oestrus.
5. Rectovaginal technique does not require vaginal speculum for AI.

SESSION 7: HANDLING OF LIQUID NITROGEN CONTAINERS AND FROZEN SEMEN

Semen used for artificial insemination (AI) is stored at an ultra-low temperature (-196˚C) in specialised containers called liquid nitrogen (LN_2) containers. The metabolic activities of semen cease at this temperature, which can be revived at the time of AI. Liquid nitrogen (LN_2) containers are double-walled containers. The walls of these containers are made up of high quality insulation material. The space between the outer and inner wall contains vacuum, therefore, these containers should be handled carefully. Improper handling of these containers may cause vacuum loss and will lead to boiling and rapid loss of liquid nitrogen. Liquid nitrogen (LN_2) containers are available in the following sizes—

(a) large size containers are basically used for storage of LN_2 at semen labs.

(b) medium size containers are used by inseminators for storage of frozen semen at farms.

(c) small size containers are used for transportation of frozen semen doses for AI on the field.

A sufficient level of liquid nitrogen should be maintained in the container at all times, so that the

semen straws remain dipped in liquid nitrogen. This is vital for maintaining semen quality. Periodical checking of the liquid nitrogen level should be done. If the level goes down, it should be refilled immediately.

Fig. 4.38: Keep the container upright

Fig. 4.39: Do not keep the container horizontally on the ground

Fig. 4.40: Do not pour liquid nitrogen directly without using a funnel

Fig. 4.41: Always use a funnel to pour LN_2 from one container to the other

Safety and Care during Handling Liquid Nitrogen Containers

The following aspects are taken into consideration while handling the liquid nitrogen containers

(i) Avoid direct contact of LN_2 containers with the hard floor.

(ii) Always keep LN_2 containers in a dry place, on a rubber or wooden plank.

(iii) Always keep the containers in a vertical position in a cool and well ventilated room (Figs. 4.38 and 4.39). Liquid nitrogen is non-toxic and non-inflammable but continuous evaporation of LN_2 in poorly ventilated rooms leads to suffocation.

(iv) Avoid direct exposure of LN_2 containers to sunlight or hot air.

(v) Frost formation on top of the outer shell of the LN_2 container and evaporation of LN_2 is an indicator of vacuum loss.

(vi) Do not tilt or roll the LN_2 container as it may lead to spilling.

(vii) The container should always be kept closed with the neck plug and lid to minimise the LN_2 loss. LN_2 containers should be opened only to retrieve the semen straw or filling LN_2.

(viii) Do not interchange the lid or canister of liquid nitrogen containers.

(ix) A loosely fitted plug may lead to excessive LN_2 loss while tightly fitted one may damage the neck plug.

(x) Avoid scrapping, welding, drilling or punching on the walls of the container.

(xi) Use a funnel to transfer LN_2 in to the container (Figs. 4.40 and 4.41).

(xii) Never overfill the container.

(xiii) Use protective measures (gumboots and gloves) while handling LN_2. Direct exposure of liquid nitrogen (-196°C) to body parts may lead to frostbite. In case of spillage, use plenty of water immediately to wash the affected part.

(xiv) Use tweezer forceps for removing semen straw from LN_2 container.

(xv) Regularly check LN_2 level in the container with a wooden or solid metal dipstick (Fig. 4.42).

(xvi) Do not stack LN_2 containers one above the other (Fig. 4.43).

(xvii) Utmost care must be taken while transporting and handling liquid nitrogen in public transport or gathering as sudden evaporation of LN_2 may cause chaos leading to accidents.

Fig. 4.42: Routinely check the level of LN_2, preferably, twice in a week

Fig. 4.43: Do not stack anything over the container

Measurement of Volume of Liquid Nitrogen in LN_2 Containers

Fig. 4.44 shows various steps to measure the volume of liquid nitrogen in LN_2 containers.

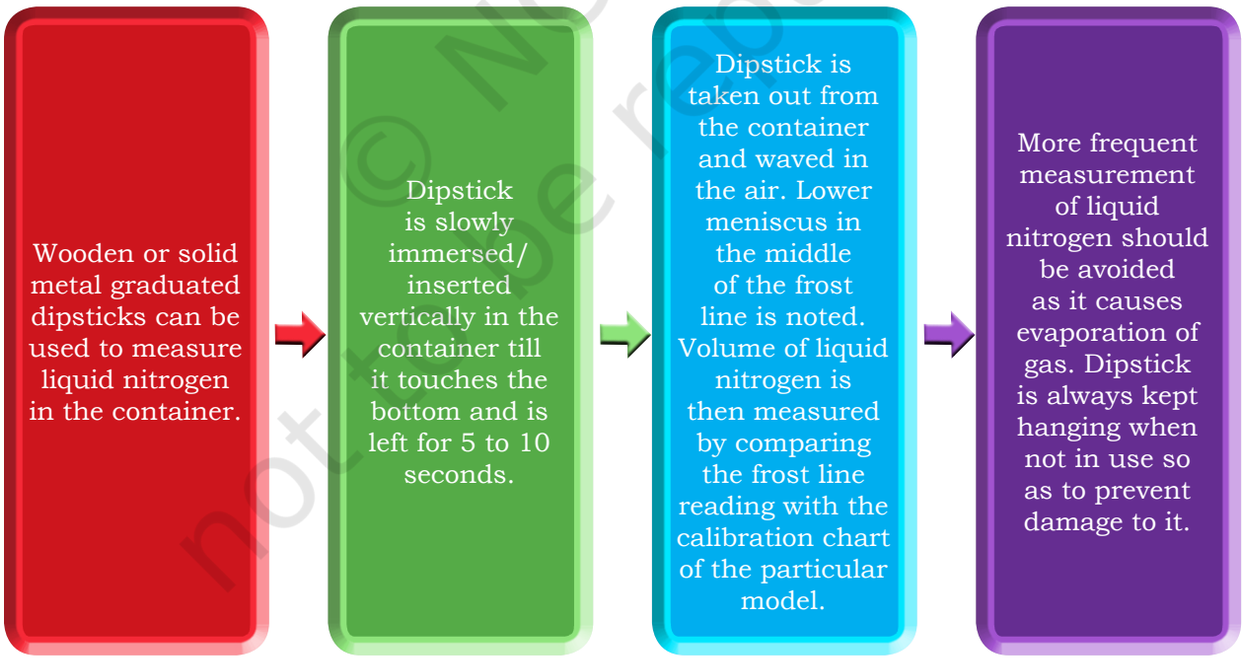


Fig. 4.44: Steps to measure the volume of liquid nitrogen in LN_2 containers

Handling and Maintenance of an AI Gun

The following points (Fig. 4.45) must be considered while handling and maintaining an AI gun.

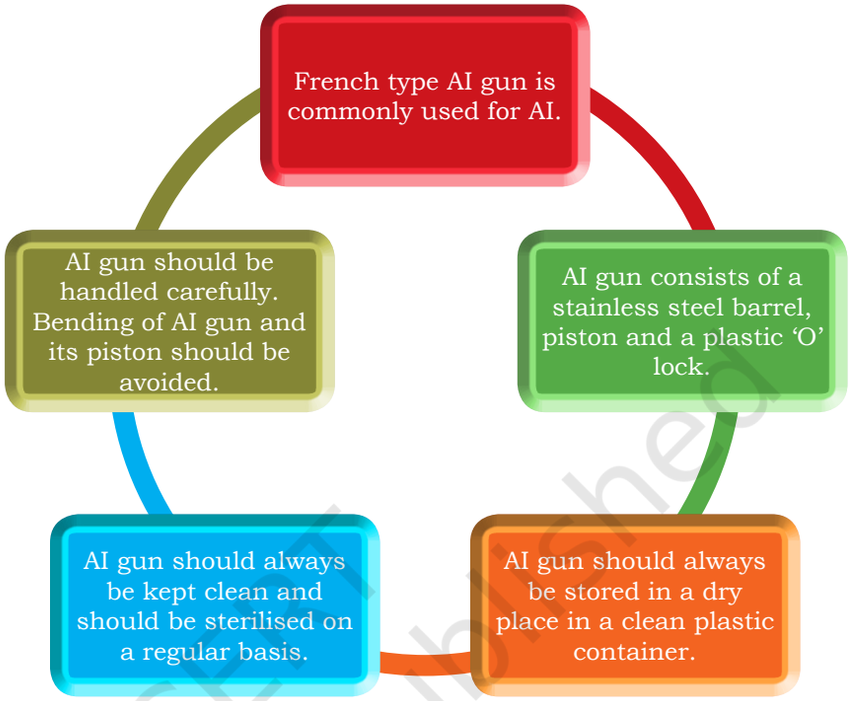


Fig. 4.45: Precautions to be taken while handling an AI gun

Handling of AI Sheath

Fig. 4.46 shows the tips to be followed while handling the AI sheath.

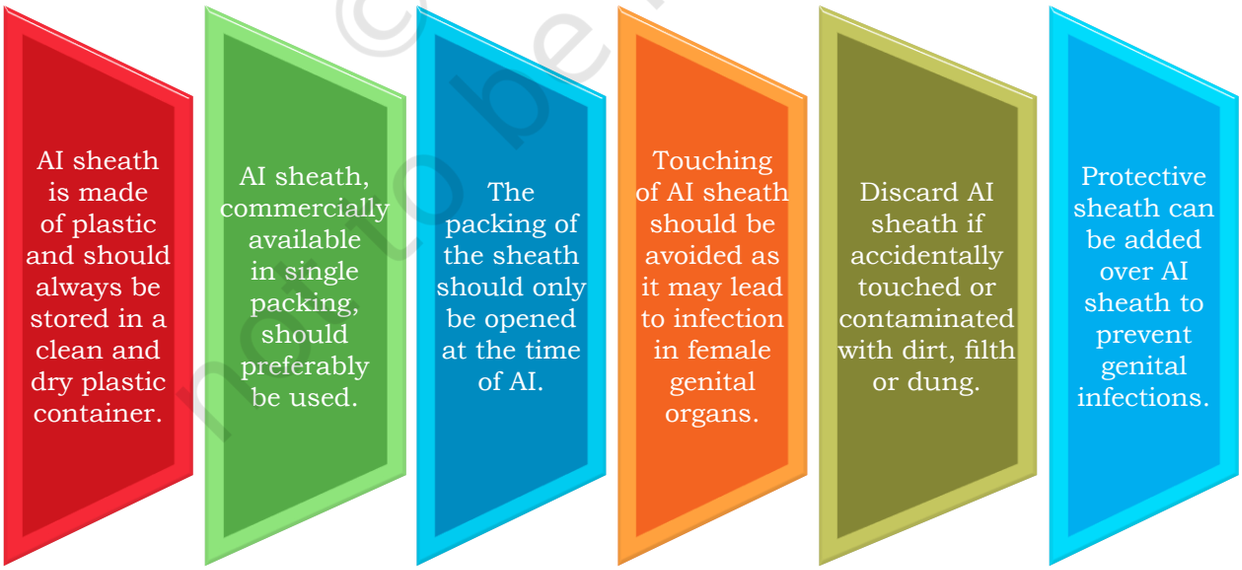


Fig. 4.46: Points to be followed while handling the AI sheath

Handling of Semen Straw

Notes

Frozen semen straws should be handled very carefully while retrieving from the LN_2 container during insemination and also during transfer from one tank to another.

Handling of semen straw during retrieval from LN_2 container

(i) Semen straw should not be exposed to high temperature. The canister should be kept below the frost line of the LN_2 container during retrieval of the straw from the container or transfer of semen dose from one container to another.

(ii) The canister from which semen straw is to be taken out should be identified before retrieval from the container.

(iii) Pre-cool the tweezer forceps in LN_2 vapours before removing the desired semen straw from the canister.

(iv) Semen straw should be removed within 10 seconds from the canister raised in LN_2 container below the frost line. If the task of straw removal from canister is not completed in 10 seconds, then the canister should again be lowered in LN_2 and lifted again to complete the task of straw retrieval.

(v) Once removed, the straw should never be placed back into the container as exposure to room temperature will make it useless.

(vi) The canister containing semen straws should immediately be lowered to the desired position after the straw retrieval.

Handling of semen straw during insemination

(i) After thawing, the semen straw should be maintained at 35˚C.

(ii) Semen straw should be wiped with a tissue paper to prevent its rapid cooling.

(iii) The straw should be shaken in air to move air space to the laboratory sealed end. This prevents semen loss while cutting the straw at the laboratory sealed end.

(iv) Semen straw should be cut at a right angle and not obliquely, to prevent semen loss due to backflow while insemination.

(v) Insemination with the straw should be performed within 15 minutes of thawing of semen.

Precautions to be taken while handling semen straw during transfer from one tank to another

(i) Liquid nitrogen containers should be kept side by side before transfer of semen straw.

(ii) Containers should be filled with LN_2 up to an optimum level before transfer.

(iii) Use an appropriate and compatible canister.

(iv) Semen doses should be transferred from one container to the other within five seconds.

(v) Semen straw should not be touched with bare hands while transferring from one container to the other as it may result in thermal injury to the semen.

Practical Exercise

1. Visit any AI Centre. Record the way technicians handle the instruments.
2. Talk to workers in the centre and enquire about handling of frozen semen containers.

Check Your Progress

A. Multiple Choice Questions

1. Semen straws should be thawed at
   (a) 37˚C for 30 seconds.
   (b) 47˚C for 30 seconds.
   (c) 37˚C for 150 seconds.
   (d) 27˚C for 30 seconds.

2. Which of the following statement is true?
   (a) Never overfill the container.
   (b) Always keep LN_2 containers on a wooden plank or rubber.
   (c) Do not tilt or roll the LN_2 container.
   (d) All of these.

3. Which of the following statement is false?
   (a) German type AI guns are commonly used for AI nowadays.
   (b) Do not bend an AI gun.
   (c) An AI gun should always be kept in a dry place in a clean container.
   (d) The tip of the gun should not be touched while loading.
4. Which of the following should not be done while handling semen straw during insemination?
   (a) Semen straw should be thawed at 37°C.
   (b) Straw should be cut at the factory end.
   (c) Straw should be cut at a right angle.
   (d) Straw should be wiped with a tissue paper.
5. Which of the following statement is not correct?
   (a) Dipstick should be kept in a container for 5–10 seconds.
   (b) LN_2 containers are filled upto 20 per cent initially while testing.
   (c) The straw should be taken out of the canister above frost line within one minute.
   (d) Liquid nitrogen is non-toxic and non-inflammable.

B. Fill in the Blanks

1. Temperature of liquid nitrogen for storage of semen straws is_____.
2. _____should be used for pouring liquid nitrogen from one container to the other.
3. Direct exposure of liquid nitrogen to body parts may cause_____.
4. The level of liquid nitrogen in LN_2 containers is measured by a wooden or metal _____.
5. _____ type of AI gun is commonly used for AI in cattle and buffalo.

C. Mark True or False

1. Thermal damage to semen is reversible.
2. Insemination with a thawed semen straw should be performed in 30–45 minutes.
3. Liquid nitrogen containers should be exposed to direct sunlight.
4. Large size AI containers are used for insemination in farms by inseminators.
5. LN_2 containers should be stacked vertically one above the other for storage.

Session 8: Management of Unproductive Animals

Infertility in cattle accounts for major losses. The reproductive efficiency of the animals may be reduced or lost due to infertility, sub-fertility or sterility. The following reproductive disorders frequently affect farm animals.

Infertility is temporary loss of fertility, which may be resumed at a later date.

Sub-fertility is the reduced level of fertility in animals.

Sterility is the complete loss of fertility in animals.

Repeat Breeding

It is a condition where the animals have a normal oestrous cycle and oestrus duration but do not become pregnant in spite of three artificial inseminations with good quality semen or three matings with a fertile bull. Repeat breeding occurs due to the following causes.

AM/PM Rule: If the animal starts exhibiting signs of oestrus in the morning, it should be inseminated in the evening and vice versa.

Improper timing of insemination: Artificial Insemination or breeding in cattle should be done 12 hours after the onset of oestrus. The AM/PM rule is followed for ensuring optimum fertilisation.

Inseminating cattle based on secondary signs of oestrus: If the animals are bred the on basis of secondary signs of oestrus, the possibility of conception is less. For optimum fertility, the animals are bred in standing heat, i.e., when the animal stands still to be mounted by other fellow animals.

Uterine infection: The conception rate is severely affected by uterine infections. Clinical cases of uterine infection are often easily diagnosed by clinical signs like pus mixed mucus discharge and hence can be treated timely. Since sub-clinical cases are difficult to diagnose, they remain untreated and have an adverse effect on the conception rate.

Improper insemination technique: Deposition of semen at the correct site using the correct technique is of utmost importance for ensuring optimum conception rate. The site of semen deposition in cattle is the uterus whereas in goats, semen is deposited in the external os of the cervix. In pigs, the semen is deposited in the uterus.

Embryonic mortality: Early embryonic death occurs due to excessive weight loss or poor body condition, heat stress, protein deficiency and obesity in animals. The deficiency or imbalance of calcium, phosphorus, vitamins A, D, E and carotene are critical for reproduction and embryonic survival. If embryonic death occurs during the first 14–15 days after conception (that is before the implantation of embryo), the length of oestrous cycle is not affected and hence embryonic loss goes unnoticed.

Clinical cases: When infection is visible externally by various signs.

Sub-clinical cases: Cases where mild infection is present but is not visible by means of clinical signs.

General guidelines for the treatment and management of repeat breeding animals

(i) As already discussed in AM/PM rule, AI should be done ideally 12 hours after the onset of oestrous. Repeat breeding due to improper timing of AI is often taken care of by inseminating twice at a 12 or 24-hour interval.

(ii) Energy deficient animals are supplemented with an energy rich diet. Trace minerals are vital for fertility hence, mineral deficiency is corrected by mineral supplementation, 20–30 g twice daily orally.

(iii) Gross overfeeding of grains is avoided. If possible, the cows are provided with adequate amounts of fresh forage.

(iv) Uterine diseases should be diagnosed by testing of blood samples and uterine swabs for presence of microorganisms. Sexual rest of one oestrus cycle helps in the elimination of mild infection.

(v) Semen quality is usually taken for granted. A system should be made for periodic checking of semen quality.

Anoestrus

This is a condition wherein the animal does not exhibit signs of oestrus in the stipulated time. Based on ovarian activity, anoestrus is also classified as true or functional anoestrus. In true anoestrus, the ovaries are smooth and inactive and no palpable structure (corpus luteum or follicles) is present in either of the ovaries on repeated

per-rectal palpation at 11 days interval (Fig. 4.48). In functional anoestrus, a corpus luteum will be present on at least one instance when palpation is performed at an 11-day interval (Fig. 4.47).

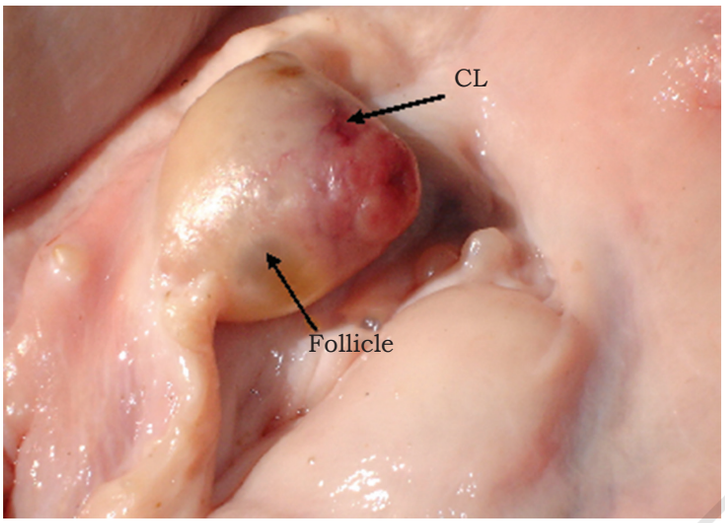


Fig. 4.47: Ovary showing corpus luteum and follicle

Fig. 4.48: Smooth ovaries showing no palpable structure

Anoestrus may occur due to deficiency of energy, minerals, vitamins, stress of production, and hormonal imbalance. Old age and prolonged exposure diseases like tuberculosis, John's disease, chronic parasitic infection, etc., may also lead to reduced body condition or debility hence, cause true anoestrus. Sometimes, animals may show signs of oestrus but it may go unnoticed due to the owner's ignorance. Sometimes, animals in confinement also do not show signs of oestrus.

General guidelines for the management and treatment of anoestrus

(i) Systematic recording of oestrus and other reproductive events is carried out so that all the oestrus animals are detected timely.

(ii) Closely observe cows for heat twice or thrice in a day for at least 20 minutes each time. Oestrus detection is done preferably during cooler parts of the day as heat signs will be more prominent in the evening and early morning than at midday.

(iii) If the cows are in confinement or stanchions, they are turned out in the paddock, at least twice daily.

(iv) If possible, oestrus detection aids like teaser bulls, heat mount device, CCTV camera, etc., are used.

(v) The suspect cows are examined per-rectally at least twice at an 11-day interval to determine the presence or absence of any palpable structure on the ovary and ascertain the cause of anoestrus.

(vi) The animals should be fed a balanced diet. Mineral deficiency should be corrected by supplementation with commercial mineral preparation at the dose rate of 20–30 g twice daily.

(vii) Problem animals should be examined for uterine abnormalities and infections, as the animals may go anoestrus in such conditions. If uterine infections are detected, the same may be corrected by intrauterine administration of antibiotics for 3–5 days.

Cystic Ovaries

Ovarian cysts are characterised as follicles greater than 2.5 cm (approximately 1 inch) in diameter remaining on an ovary for more than 10 days (Fig. 4.49). It is one of the major reproductive disorders affecting the fertility of animals. The deficiency of luteinising hormone is the main cause of cystic ovaries. Nutritional deficiency, high blood estrogen concentration, stress of high milk production and genetic causes are also associated with the incidence of cystic ovaries.

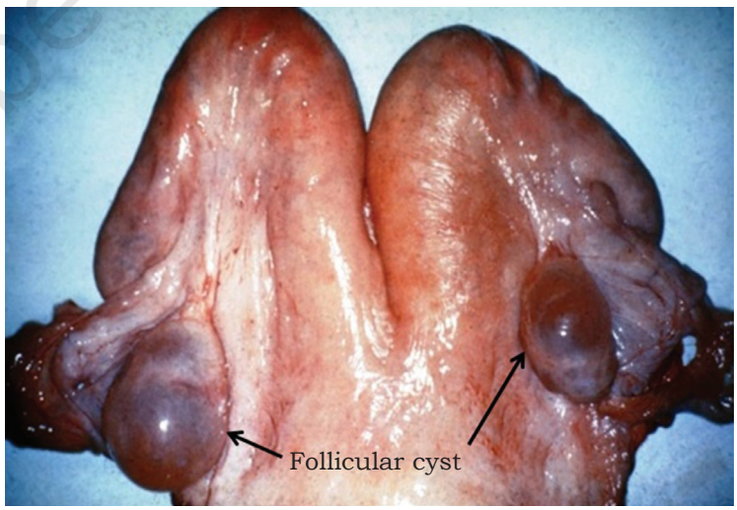


Fig. 4.49: Cystic ovaries in cattle

Cystic ovaries are associated with clinical signs like frequent, prolonged and irregular oestrus signs, abnormally raised tail head and masculine (male

Fig. 4.50: Raised tail head in a cow with cystic ovaries

like) appearance (Fig. 4.50). Animals suffering from cystic ovaries remain infertile till properly treated and have a negative impact on fertility. The treatment is usually done by injecting gonadotropin releasing hormone.

Infections of Female Reproductive Tract

Female genital tract infections are associated with conception failure. Hence, attention should be paid to their early diagnosis and treatment. They are manifested by foul smelling pus mixed with genital discharge. The microorganism present on the animal's body and surroundings may gain entry into its reproductive tract during heat period, at the time of mating with an infected bull or insemination with an unhygienic instrument. A cow giving birth (parturition) in an unsanitary calving area, results in infection of the genital tract. The animal also becomes more prone to uterine infections in cases of abnormal calving when the foetus is removed manually or when the placenta is retained after calving. Undernourished animals with low immunity (body's defence against diseases) are more susceptible to infections.

Fig. 4.51: Aborted buffalo calf with placenta

Abortions

The term abortion refers to expulsion of the foetus before completion of normal duration of pregnancy. The aborted foetuses are usually dead or they die within 24 hours of expulsion from the uterus. If the abortion tends to occur within the initial two months of pregnancy, the embryo is usually reabsorbed by the uterus and the animals do not show any clinical sign. Such cases are often called early embryonic deaths. If abortion occurs after two months, a foetus of recognisable size and placenta is expelled (Fig. 4.51).

Possible causes of early abortions

Early abortion is mainly caused by diseases called trichomoniasis and vibriosis. In later stages, abortions are mainly caused by Brucella organisms and IBR

viruses. Abortion can also occur due to injury during fighting, mounting, sudden fall, etc. Chronic diseases like parasitic infection, malnutrition, tuberculosis, etc. are also responsible for abortion in animals.

Measures for preventing abortions

(i) Regular testing of animals for abortion-causing microorganisms.

(ii) All newly purchased animals should be tested before entry into the existing herd. Ideally, newly purchased animals should be kept in a separate place, away from the main herd, for at least 60 days before their induction into the main herd. During this period, they should be screened for infectious diseases.

(iii) Pregnant animals should not be kept in the same paddock along with non-pregnant animals, as fighting and mounting activity may lead to abortion.

(iv) The aborted material especially stomach content and tissue of foetus and placenta should immediately be sent to the laboratory for diagnosis.

(v) The aborted foetus should immediately be disposed off by burying in the ground along with lime and salt.

(vi) The cattle shed should immediately be disinfected.

(vii) The cow, which has aborted, should immediately be segregated from the herd till it is confirmed negative for infectious organisms responsible for abortion.

Practical Exercise

1. Visit any livestock farm and enquire about common conditions, which affect the fertility of the animals.
2. Talk to the animal workers about day-to-day management of maintaining good fertility in the farm.

Check Your Progress

A. Multiple Choice Questions

1. An animal, with normal or nearly normal oestrus duration and oestrous cycle heat, that fails to conceive even after three inseminations with good quality semen is called _____.
   (a) anoestrous (b) repeat breeder
   (c) cystic (d) one

2. Expulsion of dead foetus _____ of gestation is called abortion.
   (a) at completion (b) after completion
   (c) before completion (d) all
3. _____ organism is mainly responsible for abortion in the later part of gestation.
   (a) Trichomonas (b) Brucella
   (c) Both (d) None
4. Manual rupture of follicle is the treatment of _____ condition.
   (a) repeat breeding (b) anoestrous
   (c) cystic ovaries (d) all
5. Calving in unsanitary calving area predispose the animals to _____.
   (a) cystic ovaries (b) anoestrous
   (c) abortion (d) uterine infection

B. Fill in the Blanks

1. Temporary loss of fertility in animals is called _____.
2. In _____ ovaries are smooth and inactive.
3. In _____ disease condition, the animals have masculine appearance.
4. Early abortions are frequently caused by a disease called _____.
5. The correct time of insemination is _____ hours after the onset of oestrous.

C. Mark True or False

1. For optimum fertility cows should be inseminated based on secondary signs of oestrous.
2. If the animal does not conceive even after six inseminations, it is called repeat breeding.
3. The treatment of true anoestrous can be done using mineral supplementation, 20–30 mg twice daily.
4. The uterine infections without any abnormal uterine discharge are referred to as sub-clinical infection.
5. The uterine infusion of antibiotics should be carried out for three days to treat uterine infection.

SESSION 9: POST-INSEMINATION SUPPORT, DATA RECORDING AND PERFORMANCE MONITORING OF BREEDING SERVICES

Relevant knowledge

For successful implementation of artificial insemination programme, critical evaluation of services and post insemination support is vital.

Post-insemination Advice to Farmer

(a) The animal owner should be asked to closely observe his animal for the next 12–24 hours. The observation should include any abnormal discharge and duration of heat.

(b) The animal should be given extra care after breeding.

(c) Breeding with scrub bulls and non-descript bulls should be avoided during the remaining part of the heat after AI.

(d) If signs of heat persist even after 18–24 hours, AI should be repeated. Else, the animals should be observed for heat symptoms after 18–21 days and also after 36–42 days.

(e) If the animal does not repeat heat after 18–21 days, it should be examined for pregnancy after two months of AI.

(f) Properly record the time of onset of heat, date and time of AI and due date for pregnancy diagnosis on expected date of calving.

Post-insemination Follow-up by the Animal Health Worker

(a) After around 21 days, a follow-up of each inseminated animal should be done to find out whether it has repeated heat.

(b) After two months, a follow-up of every inseminated animal should be done for pregnancy diagnosis and the date and result of the diagnosis should be recorded in a register.

(c) After pregnancy diagnosis, an individual follow-up of each animal should be done and the expected date of calving should be recorded.

(d) All records related to artificial insemination, pregnancy diagnosis, and calving should be meticulously recorded and maintained.

(e) Advise farmers on heat detection, feeding, management and healthcare of animals.

Notes

Significance of Data Recording in AI Programme

Data recording is very important in AI programme. A systematic recording of data enables the animal owner to get his animals examined timely for pregnancy, predict the probable time of next oestrus, diagnose infertility and anoestrus and plan suitable management according to the reproductive stage. Figure 4.52 depicts the advantages of maintaining computerised records.

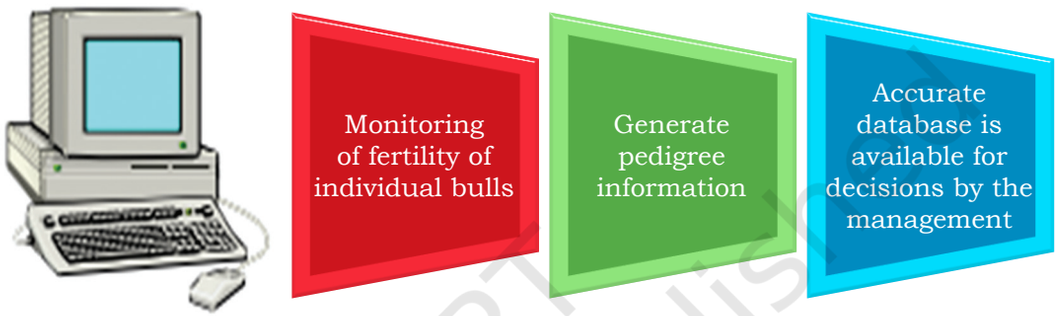


Fig. 4.52: Advantages of computerised records

All the details pertaining to breeding activity should be recorded in the register or computer. Information like identification number of the animal, age, species, breed, parity, date of previous calving and any abnormality associated with it should be recorded. The number of oestrus and inseminations since last calving, oestrus date, oestrus signs, time, date and time of AI and details of the semen used for AI should also be recorded. After AI is done, the expected date of pregnancy diagnosis, results of pregnancy diagnosis, and reproductive disorder (if any) should be recorded.

Evaluating Success and Performance Monitoring of AI Services

This monitoring is the per cent of cows that get pregnant on the first service. The target should be to achieve a conception rate of at least 45 per cent on the first service. The results should be compared with contemporaries working in the same area. The

number of services per conception is another index of breeding performance related to the effectiveness of the insemination technique. It is the total number of services done during a stipulated period of time divided by the total number of pregnancies resulting from those services. A reasonable goal is to maintain a rate of fewer than 2.0 services per conception. It must be noted that other factors in addition to AI technique can affect the conception rate and services per conception.

All inseminators should periodically attend a refresher course to review their technique, learn new developments, and obtain recommendations regarding AI.

Practical Exercise

1. Visit any livestock farm. Study different registers used for keeping farm records.
2. Talk to the animal health workers and learn how to maintain farm records.

Check Your Progress

A. Fill in the Blanks

1. Pregnancy diagnosis should be performed after _____ month/s of AI.
2. The maintenance of an average of _____ number of services per conception is an indicator of optimum reproductive status.
3. The animal should be intensively observed for signs of oestrus after _____ days of breeding.

B. Mark True or False

1. The breeding date record helps in predicting time of pregnancy diagnosis and expected date of calving.
2. If the owner is vigilant, instead of writing records he may be able to remember the date of important events for record keeping.
3. It is ideal to have a pregnancy rate of 45 per cent in the first insemination.
4. After AI, the owner should not observe his animals for the next 12–24 hours.
5. Manual or computerised breeding records of the animals are vital for easy management of the herd.